AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the above-identified application:

1. (Original) A momentum control device for positioning a spacecraft comprising:

a plurality of bodies, each operable to spin about separate axes, to produce a plurality of forces;

a unitary structure;

mounting members connected to each spinning body and the unitary structure to provide a unitary combination to receive the forces;

an attachment device comprising a plurality of struts having a predetermined static stiffness and passive damping connected to the unitary combination and adapted to be connected to the spacecraft to attenuate noise transmission from the bodies to the spacecraft and transmit the forces to the craft;

a plurality of sensors operable to produce force signals indicative of the forces in said struts; and

a control system connected to receive the force signals to control the operation of the spinning bodies in controlling the attitude of the spacecraft.

2. (Original) The momentum control device of claim 1 wherein the spinning bodies are control moment gyros and the control system is contained within the unitary combination.

3. (Original) The momentum control device of claim 1 wherein the struts are arranged as a hexapod.

4. (Original) The momentum control device of claim 1 wherein the struts are arranged as an octopod.

5. (Currently Amended) A method of mounting a plurality of spinable bodies to a spacecraft for imparting a desired torque to change the attitude of the spacecraft, comprising:

fastening a first of the plurality of bodies to a unitary mounting structure so as to allow the first body to spin about a first axis;

fastening a second of the plurality of bodies to the unitary mounting structure so as to allow the second body to spin about a second axis non-collinear with the first axis;

fastening a third of the plurality of bodies to the unitary structure so as to allow the third body to spin about a third axis non-collinear with the first or second axis;

fastening a plurality of struts having a predetermined static stiffness and passive damping between the unitary structure and the spacecraft so that forces are produced in the struts by the plurality of bodies to provide the desired torque and reducing transmission of unwanted frequency vibrations generated by the bodies to the spacecraft;

installing a force sensor on each strut, the force sensors capable of creating force signals representative of the forces applied through the struts to the spacecraft; and[,]

installing a control system within the unitary structure to receive the force signals and control the operation of the bodies to produce said torque as a function of the force signals to change the attitude of the spacecraft.

6. (Original) A momentum control device for positioning a craft comprising:

a plurality of bodies each operable to spin about separate axes and to produce a torque,

a unitary structure;

mounting members connected to each spinning body and to the unitary structure so as to provide a unitary combination for receiving the torques from the plurality of bodies;

a plurality of struts for connecting the unitary structure to the spacecraft to transmit the torques to the spacecraft, each strut comprising a force sensor to generate force information on the force transmitted to the spacecraft from the unitary structure through the strut; and

a control system to receive the force information from the force sensors to control the operation of the bodies to change the attitude of the spacecraft as a function of the forces.

7. (Original) The momentum control device described in claim 6, wherein the control system is located within the unitary structure.

8. (Currently Amended) The momentum control device described in claim 6, wherein the struts include a passive isolation system serving as a mechanical low pass filter for transmitting a desired torque [contain damping means for attenuating the transmission of noise from the spinning bodies through the unitary structure] to the spacecraft while eliminating unwanted higher frequency vibrations.

9. (Currently Amended) A momentum control device for a spacecraft comprising:

a unitary structure;

a plurality of control moment gyros operatively connected to the unitary structure, each of the plurality of control moment gyros adapted to rotate about an axis to thereby generate a torque;

a series of mounting members disposed on the unitary structure and adapted to operatively support the plurality of control moment gyros;

a control system adapted to control the operation of each of the plurality of control moment gyros to thereby generate a desired resultant torque; and

an attachment device connected to the unitary structure and including a plurality of struts, each of the plurality of struts having a predetermined static stiffness characteristic and a predetermined passive damping characteristic and including a flex pivot, the plurality of struts adapted to transmit the desired resultant torque generated by the plurality of control moment gyros and to attenuate a transmission of vibration generated by the plurality of control moment gyros.

10. (New) The device of claim 9, wherein the device includes between three and eight control moment gyros.

11. (New) The device of claim 9, further including a series of force sensors adapted to generate force information indicative of a force transmitted through each of the plurality of struts.

12. (New) The device of claim 9, wherein the unitary structure forms a rigid arrangement that connects the series of mounting members and that has a stiffness characteristic that is greater than a stiffness characteristic of the attachment device.

13. (New) The device of claim 12, wherein the unitary structure includes a plurality of terminal members and a plurality of elongated joining members.

14. (Canceled).

15. (Currently Amended) A momentum control device for positioning a spacecraft comprising:

a plurality of bodies, each of the plurality of bodies adapted to rotate about an axis to thereby generate a torque;

a series of mounting members adapted to rotatably support the plurality of bodies;

a unitary structure adapted to form a rigid arrangement having a predetermined stiffness characteristic that connects the series of mounting members;

a control system adapted to control the operation of each of the plurality of bodies to thereby generate a desired resultant torque; and

an attachment device connected to the unitary structure and including a plurality of struts, each of the plurality of struts having a predetermined static stiffness characteristic and a predetermined passive damping characteristic and including a flex pivot, the plurality of struts adapted to transmit the desired resultant torque generated by the plurality of control moment gyros and to attenuate a transmission of vibration

generated by the plurality of control moment gyros, wherein the stiffness characteristic of the unitary structure is greater than a stiffness characteristic of the attachment device.

16. (New) The device of claim 15, wherein each of the plurality of bodies is a control moment gyro.

17. (New) The device of claim 15, further including a series of force sensors adapted to generate force information indicative of a force transmitted through each of the plurality of struts.

18. (New) The device of claim 15, wherein the unitary structure includes a plurality of terminal members and a plurality of elongated joining members.

19. (Canceled).